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**ORNL
FOREIGN TRIP REPORT
TA 361388**

DATE: August 27, 2014

SUBJECT: Report of Foreign Travel Paris, France – Michael E. Dunn, Reactor and Nuclear Systems Division

TO: Jerry N. McKamy, Nuclear Criticality Safety Program Manager, National Nuclear Security Administration / NA-00-10/GTN, 1000 Independence Ave., SW, Washington, DC 20585-1290

FROM: Michael E. Dunn

**MEETING:
TITLE** 1) Collaboration meeting with the Institut de Radioprotection et de Sûreté (IRSN) and 2) Working Party on International Nuclear Data Evaluation Co-operation (WPEC)

**MEETING:
LOCATION** IRSN Headquarters and NEA Headquarters, Paris, France

**MEETING:
DATES** 1) IRSN: May 12, 2014 and 2) WPEC: May 13-16, 2014

**ATTENDEES:
ON BEHALF
OF NCSP** Michael Dunn and Luiz Leal

**MEETING:
BENEFIT TO
NCSP** Dr. Dunn is Interim Chair of the NCSP Nuclear Data Advisory Group (NDAG), and his participation in the OECD/NEA Working Party Evaluation Cooperation (WPEC) Meeting is identified in the NCSP Five Year Plan as a planned foreign travel activity. Furthermore, the objective of the WPEC meeting is to coordinate the international nuclear data measurement and evaluation work activities among the international nuclear data projects, and participation in the WPEC meeting is important for the NCSP as the meeting provides an opportunity to exchange information about nuclear data work efforts and help influence work activities that can benefit NCSP nuclear data work efforts. In addition, the NCSP is working with IRSN to identify collaborative work tasks, and as a member of the NCSP Management Team, Dunn met with IRSN staff to better define the collaborative work tasks between the NCSP and IRSN.

PURPOSE: The primary purpose of the travel is to participate in the Organization for Economic Cooperation and Development (OECD) WPEC Meeting and associated subgroup meetings. In addition, Dr. Dunn met with IRSN staff to discuss continued NCSP-IRSN collaborative work efforts.

**SITES:
VISITED** IRSN Headquarters and OECD/NEA Headquarters

ABSTRACT: On May 12, 2014, Dr. Dunn met with IRSN staff to discuss technical work tasks that are of interest to the NCSP and IRSN. During the meeting with IRSN, Dunn was able to identify technical work tasks of mutual interest to the NCSP and IRSN, and the meeting was devoted to clarifying the work tasks and path forward to establish a collaborative working relationship with IRSN. On May 13, 2014, Dunn participated in the WPEC Subgroup 39 (SG 39) meeting that is focused on “Methods and approaches to provide feedback from nuclear and covariance data adjustment for improvement of nuclear data files.” On May 13-14, 2014, Dunn participated in the WPEC SG38 Meeting that is focused on developing a new, modern Evaluated Nuclear Data File (ENDF/B) format. During the remainder of the week, Dunn participated in the general WPEC meeting, May 15-16, and the meeting focused on coordinating international nuclear data work activities in OECD member countries.

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REPORT OF FOREIGN TRAVEL

**Michael E. Dunn
Paris, France
May 10–17, 2014**

PURPOSE OF TRAVEL

The primary purpose of the travel is to participate in the Organization for Economic Cooperation and Development (OECD) WPEC Meeting and associated subgroup meetings. In addition, Dr. Dunn met with IRSN staff to discuss continued NCSP-IRSN collaborative work efforts.

Report

On May 12, 2014, Dr. Dunn met with IRSN staff to discuss technical work tasks that are of interest to the NCSP and IRSN. The agenda for the meeting along with the list of attendees is provided in Appendix A. During the first part of the meeting, Eric Letang provided an overview of IRSN and the programmatic role of IRSN in France. In addition, Letang provided background information concerning the IRSN interest in collaborating with the NCSP. Subsequently, Dunn gave an overview of the AMPX cross-section processing system that is developed and maintained with NCSP support. IRSN is interested in the AMPX library-generation capabilities because IRSN uses the SCALE package for nuclear safety analyses. The AMPX presentation resulted in a good discussion about the possibility of using the software at IRSN to support library production needs. For the remainder of the meeting, Dunn and IRSN discussed ~20 possible collaboration tasks with the NCSP. The discussions focused on the overall technical scope of each task along with the participants from IRSN and the NCSP. The work tasks were productive and helped clarify the work tasks and path forward to establish a collaborative working relationship with IRSN.

On the morning of May 13, 2014, Dunn participated in the WPEC Subgroup 39 (SG 39) meeting that is focused on “Methods and approaches to provide feedback from nuclear and covariance data adjustment for improvement of nuclear data files.” The agenda for the SG39 Meeting is provided in Appendix B. The meeting participants provided results of recent analyses using the latest covariance data. During the discussions, a technical issue was raised concerning the need for improved ^{56}Fe scattering data, and Dunn provided an update to the subgroup concerning the latest ^{56}Fe evaluation by ORNL that includes improved scattering data with angular distributions generated from the resonance parameters. The ORNL evaluation work is supported by the NCSP, and the subgroup was very interested in hearing more about the ^{56}Fe evaluation effort. Dunn arranged for Dr. Luiz Leal, who was attending the WPEC meeting but in a different subgroup meeting at the time, to join the SG39 meeting later in the day to present the status of the ORNL ^{56}Fe evaluation work that includes testing by IRSN.

During the afternoon of May 13 and continuing on May 14, 2014, Dunn participated in the WPEC SG38 Meeting that is focused on developing a new, modern Evaluated Nuclear Data File (ENDF/B) format. The agenda for the SG38 Meeting is provided in Appendix C.

The NCSP Nuclear Data and Analytical Methods program elements utilize the ENDF/B data format to transmit new nuclear data evaluations and process ENDF/B evaluations to produce radiation transport libraries, respectively. As a result, the ENDF/B format is key to the NCSP work tasks involving the use of the ENDF/B nuclear data formats. Dunn is the Chair of the

international ENDF/B Formats Committee, and Dunn leads the ORNL and NCSP nuclear data work efforts. Meeting participants included staff from the Japanese, European, US and China nuclear data projects. The meeting focused on the various components of the new XML-based ENDF/B data structure (e.g., low-level containers, resonances, fission product yields, etc.). During the meeting Dunn led a discussion on “meta-evaluations” that define how future evaluations would be combined together from different physical regimes to form a new evaluation (e.g., coupling thermal scattering law data with “fast” neutron cross-section data). During the last part of the meeting on May 14, the subgroup discussion focused on the long-term governance model for the future ENDF/B format once the SG38 effort is complete.

During the remainder of the week, Dunn participated in the general WPEC meeting that is focused on coordinating international nuclear data work activities in OECD member countries. The agenda for the WPEC Meeting is provided in Appendix D. In the first part of the meeting, the participating countries provided a status report of nuclear data measurement activities in Europe, South Korea, Japan, U.S., Russia, and China. Following the experiment reports, status reports from the different evaluation projects included the U.S. (ENDF), Europe (JEFF), Japan (JENDL), Russia (ROSFOND/BROND), and China (CENDL). Also, the evaluation reports included reports from the IAEA and the Talys evaluated nuclear data library (TENDL). During the remainder of the meeting, the different WPEC subgroups provided a status report on their respective work activities. As part of the WPEC High Priority Request List (Subgroup C), there was a detailed discussion on the nuclear data needs for ^{239}Pu that is a key isotope for the NCSP. Specifically, the discussion focused on the need for new measured data for fission, nu-bar, and fission spectrum data. During the discussion, Dunn reported on the recent NCSP work by ORNL for ^{239}Pu , and the NCSP work has demonstrated the need to revise the ^{239}Pu nu-bar values in the resonance region.

In the last part of the WPEC meeting, a proposal was presented by Luiz Leal (ORNL) to establish a new subgroup focused on improving measurement and evaluation capabilities for thermal scattering law data. Thermal neutron scattering is a key nuclear data work area in the NCSP, and the proposed subgroup aligns with the NCSP nuclear data work effort.

Overall, Dunn’s participation in the WPEC meetings provided the opportunity to ensure the NCSP Nuclear Data and Analytical Methods interests are represented in the international nuclear data community. In addition, there is an opportunity to leverage international measurement and evaluation capabilities to address current and emerging nuclear data needs for the NCSP.

Itinerary

5/10/2014 - 5/11/2014	Travel from Knoxville, TN, USA to Paris, France
5/12/2014	Meeting with IRSN
5/13/2014 – 5/16/2013	WPEC Meetings
5/17/14	Travel from Paris, France to Knoxville, TN, USA

DISTRIBUTION

1. Nichole Ellis (ellis_9899@msn.com)
2. Jerry N. McKamy (Jerry.McKamy@nnsa.doe.gov)
3. Lori Scott (Lorisc0tt@aol.com)
4. Gladys Udentia (gladys.udentia@nnsa.doe.gov)

Appendix A
Meeting on collaboration between IRSN and DOE NCSP

IRSN, Fontenay-aux-Roses, France
May 12, 2014, 9:30 – 17:00

Participants:

ORNL: Mike Dunn

IRSN:

1. Collaboration proposals participants: E. Létang, T. Ivanova, M. Duluc, I. Duhamel, S. Pignet.
2. AMPX Presentation attendees: E. Létang, T. Ivanova, S. Pignet, G. Ferran, W. Haeck, I. Duhamel, F. Bernard, M. Brovchenko, A. Jinaphanh, N. Leclaire, B. Cochet.

Objectives:

1. Review IRSN's collaboration proposals in order to determine specific areas of mutual interest between DOE NCSP and IRSN and further determine where IRSN can collaborate with NCSP by providing technical expertise and /or data and benefit from the resulting NCSP technical expertise and /or data.
2. Discuss cross-section processing capabilities (AMPX, NJOY, and others).

Agenda:

- 9:30 Introduction, Organizational Chart of the IRSN Points of Contact, E. Létang.
- 10:30 AMPX Presentation, M. Dunn.
Questions/Discussion, All.
- 12:00 Lunch
- 13:30 IRSN's Collaboration Proposals Updated Following Meetings in LANL (March 2014),
IRSN participants.
- 14:30 Discussion on DOE NCSP-IRSN Collaboration Agreement and Collaboration Proposals,
All.

Appendix B WPEC Subgroup 39 Agenda

Subgroup 39 Meeting AGENDA (Proposal)

a) May 13

- 9:00-9:15 Welcome, approval of Agenda, new members etc
- 9:15-9:45 Review of actions (including remarks, if any, on paper "Comments on Covariance Data of JENDL-4.0 and ENDF/B-VII.1" sent by M.Ishikawa)
- 9:45-10:45 Computation of sensitivity coefficients with Monte Carlo tools and results of an inter-comparison for Flattop and ZPR benchmarks (T.Ivanova, E.Ivanov, I.Hill, J.Dyrda, S.Pelloni, I.Kodeli)
- 10:45-11:00 Coffee break
- 11:00-11:20 Role of shielding benchmarks e.g. ASPIS (I.Kodeli)
- 11:20-12:20 Use of specific new experiments:
 - PROTEUS (S.Pelloni)
 - STEK (M.S)
 - Experiments related to U-235, U-238, Fe, and Na (G.Palmiotti)
 - Comments on beta-eff measurements (paper sent by M.Ishikawa)
- 12:20-12:40 Update on ICSBEP and IRPhEP Database Tools, DICE and IDAT (I.Hill)
- 12:40-14:00 Lunch
- 14:00-14:30 New studies at JAEA on adjustment trends (K.Yokoyama)
- 14:30-15:30 Comparison of adjustment trends (E.Dupont, K.Yokoyama, G.Palmiotti, P.Archier, M.S)
- 15:30-15:45 Coffee break
- 15:45-16:15 Results to be presented at the joint meeting with CIELO: discussion (All)
- 16:15-17:00 Methodology issues (G.Palmiotti)
- 17:00-17:30 Next steps and meeting

b) Proposed SG39 presentations for the joint CIELO/SG39 meeting on May 14:

- Discussion on adjustment trends of ADJ2010 (K.Yokoyama) (20')
- Discussion on adjustment trends from ENDF/B-VII (G.Palmiotti) (20')
- Discussion on adjustment trends from JEFF/CEA (P.Archier) (20')
- Comparison of adjustment trends (E.Dupont, G.Palmiotti) (50')
- Method issues, covariance validation, needs and perspectives (G.Palmiotti, MS, All) (40')

Appendix C WPEC Subgroup 38 Agenda

Agenda for the next meeting of WPEC Subgroup #38 (on creating a modern nuclear database structure). The meeting will be held at the NEA Databank on Tuesday May 13 (commencing at 1 p.m.) and Wednesday May 14 (all day). We also have a room reserved for further discussion on Thursday May 15.

Main goals for the meeting:

- Review and adopt requirements and specifications for low-level data containers as well as for the particle database structure.
- Review and adopt requirements for the high-level hierarchy.

Draft requirements and specifications documents will be distributed before the meeting, and attendees are asked to review the drafts and come prepared with supporting or counter-proposals.

Tuesday May 13

Room B

- | | |
|-------|--|
| 13:00 | Introduction - D. McNabb |
| 13:15 | Presentation of the current draft requirements for low-level data containers. Discussion and counter-proposals will be welcomed.
(Chair: M. White)
After reviewing the requirements, presentation of the current draft specifications for low-level containers. (Chairs: J. Conlin, B. Beck) |
| 15:15 | <i>Break</i> |
| 15:45 | Presentation of draft requirements and specifications for a particle/decay database. (Chair: C. Mattoon)
Review feedback from R. Capote, A. Sonzogni |
| 17:30 | <i>Adjourn</i> |

Wednesday May 14

Room B

Distribute updated requirements documents for low-level containers and the particle database based on the Tuesday discussion.

Review draft requirements for the top-level hierarchy. Due to the large scope of this requirements document, this session has been broken into sections, and presenters assigned to give a summary of each section along with their view of its strengths and weaknesses and any counter-suggestions. (Chair: D. Brown)

Each review is 20 min. plus 5 min. for questions and discussion

9:00	Welcome & Overview (D. Brown)
9:20	Documentation (A. Trkov for R. Capote)
9:45	Top level & fission (D. Brown)
10:10	Covariances (A. Trkov for R. Capote)
10:35	Resonances (D. Brown)
11:00	Fission Product Yields (R. Mills)
11:25	Thermal Scattering Law (D. Brown)
12:00	<i>Lunch</i>
13:00	MetaEvaluations (M. Dunn)
13:25	Coulomb scattering (B. Beck)
13:50	Atomic scattering (C. Mattoon)
14:15	Derived data (M. White/J. Conlin)
14:40	Wrap-up/Path Forward (D. Brown)
15:00	<i>Break</i>
15:30	Review the updated requirements and specifications for low-level data containers, decide whether we have preliminary agreement to adopt them. (Chairs: M. White, B. Beck)
16:00	Review updated particle database requirements and specifications, determine whether we have preliminary agreement. (Chairs: C. Mattoon)
16:30	Suggested long-term governance model after SG38 concludes. (Chair: D.McNabb)
17:30	<i>Adjourn</i>

Thursday May 15

Room A

All day	Working session: update requirements, work on implementing changes, add to documentation, etc.
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Appendix D WPEC Agenda

For Official Use

NEA/SEN/NSC/WPEC(2014)1

Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development

24-Apr-2014

English - Or. English

NUCLEAR ENERGY AGENCY
NUCLEAR SCIENCE COMMITTEE

NEA/SEN/NSC/WPEC(2014)1
For Official Use

Working Party on International Evaluation Co-operation

Twenty-sixth Meeting of the NEA Working Party on International Nuclear Data Evaluation Co-operation

PROPOSED AGENDA (DRAFT)

15-16 May 2014 (9:00 start)
NEA Headquarters
Issy-les-Moulineaux, France

Emmeric Dupont
emmeric.dupont@oecd.org
+33 1 45 24 10 84

JT03356561

Complete document available on OLIS in its original format

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English - Or. English

OECD/NEA Nuclear Science Committee
Working Party on International Nuclear Data Evaluation Co-operation

**Twenty-sixth Meeting of the
NEA Working Party on International Nuclear Data Evaluation Co-operation**

15 (starting at 9:00 a.m.) – 16 May 2014
NEA Headquarters, 7th floor, room B
12 boulevard des Iles
92130 Issy-les-Moulineaux, France

Please be advised that security arrangements at the OECD Nuclear Energy Agency require that you report upon arrival to the Reception Desk on the ground floor with a photo ID. A badge will be issued that will allow you to enter the premises at all times during the meeting. Local information about hotels and transport, as well as an area map, can be found on the Web page www.oecd-nea.org/general/practical.

Proposed Agenda (DRAFT)

Start at 9:00am

1. **Adoption of Agenda**
2. **Approval of the Summary Record of the Twenty-fifth Working Party meeting**
[\[NEA/SEN/NSC/WPEC\(2013\)2\]](#)
3. **Membership and observers**
 - Participation of the CENDL project
 - Informal discussions on criteria defining an “*evaluation project*”
4. **25th Anniversary of the Working Party**
 - Brief overview of WPEC history
5. **Reports on experimental activities**
 - NEA DB (Europe, South Korea)
 - Japan
 - USA
 - Russia
 - China
6. **Brief progress reports from evaluation projects and discussion of future plans**
 - ENDF
 - JEFF
 - JENDL
 - ROSFOND/BROND
 - CENDL

- IAEA activities
 - TENDL (by invitation)
- 7. Review of final or near-final subgroup reports**
- Subgroup 27: Prompt photon production from fission products (*R. Jacqmin, JEFF*)
 - Subgroup 28: Processing of covariance data (*M. Dunn, ENDF*)
 - Subgroup 31: Meeting nuclear data needs for advanced reactor systems (*H. Harada, JENDL*)
 - Subgroup 33: Methods and issues for the combined use of integral experiments and covariance data (*M. Salvatores, G. Palmiotti, ENDF*)
 - Subgroup 34: Coordinated evaluation of ^{239}Pu in the resonance region (*C. De Saint Jean, JEFF*)
 - Subgroup 35: Scattering angular distribution in the fast energy range (*T. Kawano, ENDF*)
 - Subgroup 36: Reporting and usage of experimental data for evaluation in the resolved resonance region (*P. Schillebeeckx, JEFF*)
- 8. Status of on-going or start-up subgroups**
- Subgroup C: The High Priority Request List for nuclear data (*A. Plompen, JEFF*)
 - Renewal of Subgroup mandate (2014-2016)
 - Subgroup 37: Improved fission product yield evaluation methodologies (*R.W. Mills, JEFF*)
 - Subgroup 38: A modern nuclear database structure beyond the ENDF format (*D. McNabb, ENDF*)
 - Subgroup 39: Methods and approaches to provide feedback from nuclear and covariance data adjustment for improvement of nuclear data files (*M. Salvatores, G. Palmiotti, ENDF*)
 - Subgroup 40: Collaborative International Evaluated Library Organisation (CIELO) Pilot Project (*M. Chadwick, ENDF*)
- 9. Proposals for new subgroups**
- Improving nuclear data accuracy (proposal by H. Harada and P. Schillebeeckx)
- 10. Conferences and meetings of interest to the nuclear data community**
- ND2013
 - ND2016
 - ND Meeting calendar (www.oecd-nea.org/science/wpec/calendar.html)
- 11. Any other business**
- 12. Date and place of next meetings**
- Proposal: May 18-22, 2015, NEA Headquarters